Gskew

Gskew is a program which modifies g-code X and Y coordinates to offset un-squareness or skew inherent in a plotter/router/engraver/milling machine. It is best to square the machine itself but sometimes this is not possible or cannot be done accurately enough. Normally the skew is quite small and the effect is not seen when milling single sided items. However, when milling double sided items which have to be precisely aligned (such as isolation routed double sided pcb's), the effect is doubled and can lead to errors.

If the holes on double sided pcb's are not aligned with both pads, it can be caused by skew. To find out if this is the case, this procedure has to be followed:
Secure a large piece of flat scrap material (for example a delrin or aluminium sheet) on the baseplate. Then use custom written gcode to drill 4 holes (about 0.8mm) either in a square or rectangle shape. The shape should be as large as possible but make sure you have a (digital) venier caliper which is large enough to measure the diagonals of the shape. Put the caliper in the holes and make sure to keep it upright when making measurements.
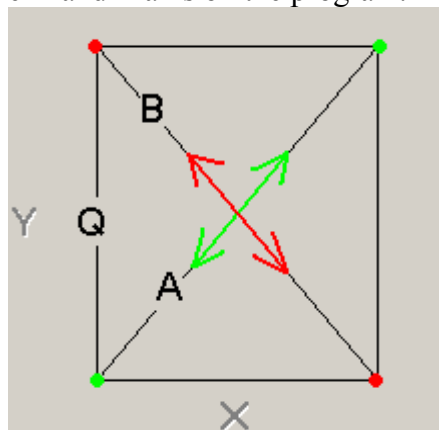
Make a note of these lengths:
A – From bottom left to top right (green distance).
B- From top left to bottom right (red distance).
Q- From bottom left to top left.
Note the correct orientation of the X and Y axis on the program.

Alternatively, The skew angle (which turns the square into a parallelogram) in degrees can be entered directly. For this, the applicable button has to be selected. If the length radio button is selected, the skew angle which is derived from the A,B, and Q values will be updated upon changing the A, B, and Q values. If these values are invalid, an able of 0 will be displayed.

There are two other radio buttons on the program:
"Board is flipped in X"
"Board is flipped in Y"
It is important that the correct one is selected.
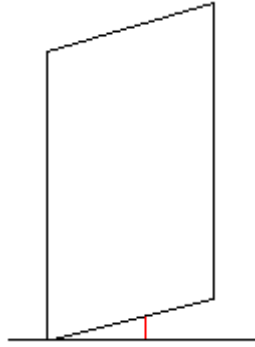Select flipped in X if:
The board is swapped in left and right. So all the X coordinates for milling will change but the Y coordinates will remain the same.
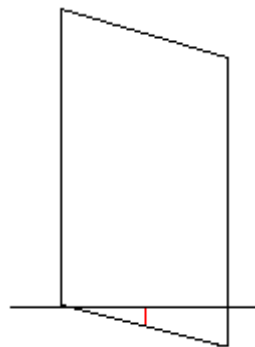Select flipped in Y if:
The board is swapped in up and down. So all the Y coordinates for milling will change but the X coordinates will remain the same.
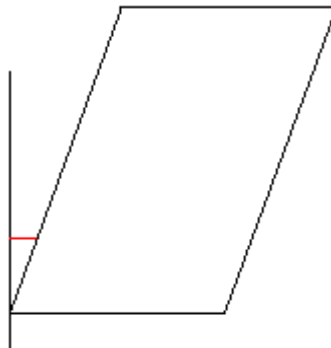If a single sided board is used, either option can be selected.

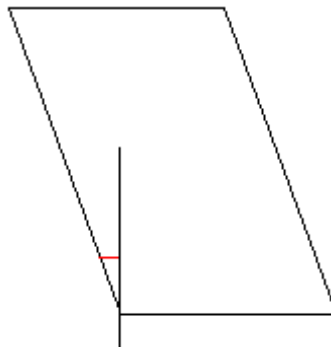Note the usage of positive and negative skew angles. This is a positive angle if the board is flipped in Y:

And this is considered a negative angle if the board is flipped in Y:

This is a positive angle if the board is flipped in X:

And this is considered a negative angle if the board is flipped in X:

If A is bigger then B, a positive angle is always used. The actual parallelogram shape which is

supposed to be a square or rectangle, drawn by the milling machine has noting to do with the shapes drawn above. It has all to do with frames of reference. Just use the explanation above to decide which option to select.

If the board is flipped in X, the X and Y coordinates will only be modified if a Y coordinate is present. If no X coordinate is present, one will be created. If the board is flipped in Y, the X and Y coordinates will only be modified if an X coordinate is present. If no Y coordinate is present, one will be created.

G-code format considerations:
-The program considers either the character "/" or "(" the start of a comment and the line will not be modified.
-Only one X and/or Y coordinate per line is supported. Z coordinates are ignored.
-The order in which the X and Y coordinates appear relative to each other does not matter.
-The conversion logic is transparent to the usage of spaces and tabs.
-The program is tested with all the styles generated by pcb-gcode. Other g-code styles my not work.
-The conversion logic is not case sensitive.

To process a file, drop it anywhere on the program. A new file with the letters "_COR" (indicating corrected) is created in the same directory as the original. Multiple files can be dropped at the program at once. Any existing files with the same name as the output file will be overwritten. Both milling (top and bottom) and drilling gcode files should be processed to correct for skew. Do not drop any non-gcode files onto the program.

After the measurements for A, B, and Q are made with your custom gcode, use the program to modify that same gcode using either option "Board is flipped in X" or "Y". Offset the origin of the mill a bit and drill 4 new holes and measure them. There is no skew if there is no difference between A and B. The less difference between A and B, the less skew is present. Repeat this procedure to tweak the results. Milling a few pads and then drilling a hole in it on a double sided PCB makes error checking more precise. Changing the angle during tweaking makes this easier. Note that measuring A, B, and Q, only gives you a ballpark figure for correction and is not very precise. It does require tweaking the result further by milling double sided pads with holes a few times with different angle values. The orientation of the pads to be milled should be:
If the board is flipped in X: one vertical row of pads along the Y axis.
If the board is flipped in Y: one horizontal row of pads along the Y axis.

Both the program and it's source are provided free of charge and with no license.

Disclaimer:
This program can potentially damage your machine or make it behave unpredictably. Therefore it can cause serious personal injury and damage the hardware. Use this program at your own risk. The author is not responsible of anything whatsoever related to this program.

Please provide any bug reports to:
schouten.tjeerd-at-gmail-dotcom